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Hence there are six sets of solutions:

$$x=0, y=0; x=-\frac{p}{m} \omega^3, y=-\frac{p}{m} \omega^2.$$

(2) Solution of the simultaneous equations

$$mx^4+py=0, my^3+px^3=0.$$

In addition to the solutions  $x=y=0$ , there are exactly nine sets of solutions

$$x=\varepsilon p^{4/9}m^{(-4)/9}, y=-\varepsilon^4 p^{7/9}m^{(-7)/9},$$

where  $\varepsilon$  is an arbitrary ninth root of unity.

165. Proposed by J. K. ELLWOOD, A. M., Principal of Colfax School, Pittsburg, Pa.

Solve  $x^4-x=14$ , by quadratics.

Solution by G. B. M. ZERR, A. M., Ph. D., Professor of Chemistry and Physics, The Temple College, Philadelphia, Pa.

$$x^4-x=14 \text{ or } x^4-16=x-2.$$

$$\therefore x^2-4=\frac{x-2}{x^2+4}=\frac{x}{x^2+4}-\frac{2}{x^2+4}.$$

$$\therefore x^2-\frac{x}{x^2+4}+\frac{1}{4(x^2+4)^2}=4-\frac{2}{x^2+4}+\frac{1}{4(x^2+4)^2}.$$

$$\therefore x=2 \text{ or } x=-2+\frac{1}{x^2+4}.$$

$$\therefore x=2 \text{ or } x^3+2x^2+4x+7=0.$$

$$\therefore x=2 \text{ or } =-1\frac{1}{6} \text{ nearly, or } -\frac{1}{15}[1 \pm \sqrt{(-843)}] \text{ nearly.}$$

166. Proposed by MARCUS BAKER, U. S. Geological Survey, Washington, D. C.

Solve

$$ax+by=2zx \dots (1).$$

$$cy+dz=2xy \dots (2).$$

$$ez+fx=2yz \dots (3).$$

Solution by the PROPOSER.

From (1), (2), and (3), respectively,

$$y=\frac{(2z-a)x}{b}=\frac{dz}{2x-c}=\frac{ez+fx}{2z},$$

whence

$$x(2x-c)(2z-a)=bdz \dots (4),$$

$$fx(2x-c)+ez(2x-c)=2dz^2 \dots (5).$$